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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte LESTER F. LUDWIG

Appeal 2009-006844[1]
Application 10/676,926
Technology Center 2800

Before JOSEPH F. RUGGIERO, JOHN A. JEFFERY, and MARC S. HOFF, *Administrative Patent Judges.*

JEFFERY, *Administrative Patent Judge.*

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[1] This appeal is said to be related to six other appeals in connection with Application Serial Numbers (1) 09/812,400; (2) 10/680,591 (Appeal No. 2009-008916); (3) 10/702,262 (Appeal No. 2009-009356); (4) 10/703,023 (Appeal No. 2009-010281); (5) 10/737,042 (allowed); and (6) 11/040,163 (Appeal No. 2010-009424). App. Br. 4. *Accord* Ans. 2. Appellant, however, notes that prosecution was reopened in the '262 application. App. Br. 4; Supp. App. Br. 2. Also, in the Supplemental Brief, Appellant replaces the '042 application (which was allowed) with 10/702,415 (Appeal No. 2009-008141) in which an appeal was filed August 8, 2008. Supp. App. Br. 2. We also previously decided one of these appeals (09/812,400). *See Ex parte Ludwig*, No. 2009-002201, 2009 WL 3793386 (BPAI 2009) (non-precedential) (reversing the Examiner's anticipation and obviousness rejections).

DECISION ON APPEAL[2]

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-96. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

Appellant's invention generates control signals based on higher-frequency overtone components of incoming signals for music synthesizers. *See generally* Spec. ¶¶ 0351-59; Figs. 64-66. Claim 1 is illustrative:

1. A system for control signal generation using detected dynamic characteristics of frequency components of an incoming electronic signal, said incoming electronic signal comprising a fundamental frequency component and at least one overtone component of a higher frequency than said fundamental frequency component, said fundamental frequency component and said at least one overtone component comprising an amplitude parameter and a pitch parameter, said system comprising:

at least one bandpass filter adapted to isolate said at least one overtone component from said incoming electronic signal to produce an isolated overtone signal;

a separate signal parameter measurement element operatively coupled with each filter of said at least one bandpass filter, wherein said signal parameter measurement element provided amplitude measurement of said isolated overtone signal resulting in an isolated overtone parameter signal; and

[2] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the "MAIL DATE" (paper delivery mode) or the "NOTIFICATION DATE" (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

a parameter signal processing unit for receiving said isolated overtone parameter signal, said parameter signal processing unit generating an outgoing control signal based upon said isolated overtone parameter signal.

The Examiner relies on the following as evidence of unpatentability:

Fricke	US 4,265,157	May 5, 1981
Pattie	US 5,343,793	Sept. 6, 1994
Lindemann	US 5,744,742	Apr. 28, 1998
Suzuki	US 5,981,859	Nov. 9, 1999

THE REJECTIONS

1. The Examiner rejected claims 1-3, 12, 13, 17-19, 25-44, 46, 53, 54, 58-60, 66-88, and 90-96 under 35 U.S.C. § 102(b)[3] as anticipated by Lindemann. Ans. 3-4.[4]
2. The Examiner rejected claims 4-11, 20-24, 45, 47-52, and 61-65 under 35 U.S.C. § 103(a) as unpatentable over Lindemann, Pattie, and Frick. Ans. 5-6.
3. The Examiner rejected claims 14-16, 55-57, and 89 under 35 U.S.C. § 103(a) as unpatentable over Lindemann and Suzuki. Ans. 6.

[3] Despite the present application's domestic priority date of May 15, 1998, the Examiner's reliance on Lindemann (which issued April 28, 1998) as qualifying as prior art under § 102(b) is undisputed.
[4] Throughout this opinion, we refer to (1) the Appeal Brief filed March 31, 2008 (supplemented September 8, 2008); (2) the Examiner's Answer mailed August 8, 2008; and (3) the Reply Brief filed October 8, 2008.

THE ANTICIPATION REJECTION

Regarding independent claim 1, the Examiner finds that Lindemann discloses every recited feature including a "bandpass filter" (which the Examiner equates to Lindemann's formant filter generator 130) that is said to isolate at least one overtone component from an incoming electronic signal to produce an "isolated overtone signal," namely intermediate tone 131. Ans. 3-4, 9. According to the Examiner, Lindemann's amplitude envelope builder 125 (which the Examiner equates to the recited "signal parameter measurement element") measures the isolated overtone signal's amplitude as claimed by applying an amplitude envelope to this "isolated overtone signal." Ans. 4, 8. This process is said to ultimately result in generating a "control signal" as claimed, namely output tone 140 and corresponding audio output 160. Ans. 4, 6-7.

Appellant challenges the Examiner's equating Lindemann's audio signals to the recited "control signal" since they are completely different types of signals, a fact allegedly evidenced by Lindemann's explicit distinction between such signals and their recognized distinction in the art. App. Br. 12-24; Reply Br. 3-8. Appellant also argues that Lindemann's amplitude envelope builder does not measure amplitude at all, let alone measure the amplitude of the identified "isolated overtone signal" since the output of the formant filter generator 130 (i.e., intermediate tone 131) is not provided to the amplitude envelope builder to measure this signal's amplitude. App. Br. 25-27; Reply Br. 9-11. Appellant also contends that the Examiner failed to identify (1) which signals in Lindemann correspond to the recited incoming electronic signals with fundamental and overtone frequency components (App. Br. 27-29; Reply Br. 11-13), and (2) the

particular portions of Lindemann relied upon to reject 74 dependent claims (App. Br. 29-30; Reply Br. 14).

The issues before us, then, are as follows:

ISSUES

Under § 102, has the Examiner erred in rejecting claim 1 by finding that Lindemann discloses:

(1) a bandpass filter adapted to isolate at least one overtone component from an incoming electronic signal to produce an isolated overtone signal;

(2) a separate signal parameter measurement element operatively coupled with the filter that measures the isolated overtone signal's amplitude resulting in an isolated overtone parameter signal; and

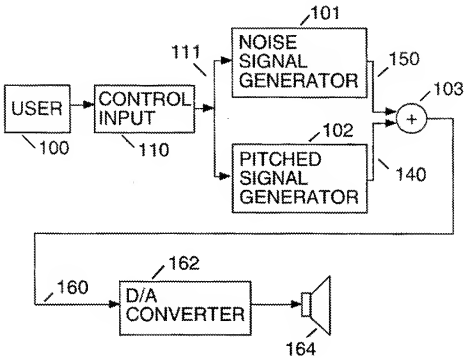
(3) a parameter signal processing unit that generates an outgoing control signal based upon the isolated overtone parameter signal?

FINDINGS OF FACT (FF)

1. Lindemann discloses a parametric signal modeling music synthesizer in which a user 100 selects an instrument and a particular tone via input device 110 (e.g., a keyboard). Electronic control signals 111 specify at least the instrument and an initial pitch and intensity. Audio output 160 of this musical tone is the sum 103 of (1) a "pitched part" 140[5] generated by pitched signal generator 102, and (2) a "noise part" 150

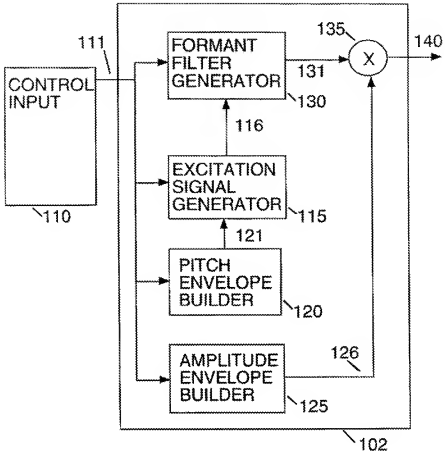
[5] Lindemann also refers to numeral 140 as an "output" of the pitched signal generator. *See, e.g.*, Lindemann, col. 7, ll. 41-42. *But see* Lindemann, col. 13, ll. 42, 46-47 (referring to "pitched signal generator 140").

generated by noise signal generator 150. The audio output 160 is run through digital-to-analog converter 162 to speaker 164. Lindemann, col. 6, ll. 10-23; Fig. 1. A block diagram of Lindemann's music synthesizer in Figure 1 is reproduced below:



Block Diagram of Lindemann's Music Synthesizer in Figure 1

2. Lindemann details pitched signal generator 102 in Figures 2 and 3. As shown in those figures, the pitched signal generator comprises (1) formant filter generator 130; (2) excitation signal generator 115; (3) pitch envelope builder 120; and (4) amplitude envelope builder 125. Control signals 111 are directed to each of these components to control the output tone's (1) instrument; (2) pitch; and (3) intensity. A block diagram of Lindemann's pitched signal generator 102 is shown in Figure 2 reproduced below:



Block Diagram of Lindemann's Pitched Signal Generator in Figure 2

3. Excitation signal generator 115 generates an excitation signal 116 based on the instrument and pitch specified by the control signals. Formant filter generator 130 generates a formant filter that models the instrument's time-varying frequency response at the desired pitch. The generated formant filter then filters the excitation signal resulting in a reasonably realistic intermediate tone 131. Amplitude envelope builder 125 generates an amplitude envelope that modifies intermediate tone 131 in a time-varying manner. Lindemann, col. 6, l. 62 – col. 7, l. 9; Fig. 2.

4. Excitation signal 116 is (1) generated by table lookup oscillator 207, and (2) comprises a periodic tone with a fixed harmonic structure determined at the onset of the note. This periodic tone is filtered by a time-varying formant filter generated by filter generator 208 to produce intermediate tone 131. Then, multiplier 209 applies an amplitude envelope 126 (generated by amplitude envelope builder 125) to this filtered tone to ultimately produce output 140. Lindemann, col. 7, ll. 10-67; Fig. 3. A detailed block diagram of Lindemann's pitched signal generator 102 is shown in Figure 3 reproduced below:

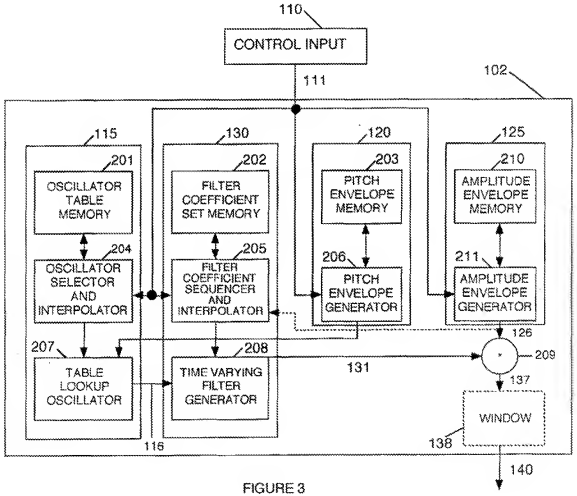


FIGURE 3

Detailed Block Diagram of Lindemann's Pitched Signal Generator in Figure 3

5. Amplitude envelope builder 125 comprises amplitude envelope memory 210[6] and amplitude envelope generator 211. In one embodiment, the amplitude envelope is applied only as a post multiplier to the output 131 of the time-varying filter generator 208 of formant filter generator 130. Lindemann, col. 19, ll. 63 – col. 20, ll. 3; Fig. 3.

6. Amplitude envelope memory 210 stores representations of time-varying amplitude envelopes, where each envelope is associated with pitch and intensity of the original tone from which the envelope was derived. To generate new envelopes based on input pitch and intensity, amplitude envelope generator 211 interpolates between entries in memory (i.e., by linearly combining envelopes associated with surrounding stored points in pitch-intensity space). Lindemann, col. 20, ll. 50-59; Fig. 3.

7. Amplitude envelope generator 211 interpolates between stored amplitude envelopes in memory 210 by (1) finding the amplitude envelopes associated nearest higher and lower pitches to the input pitch, respectively; (2) calculating an envelope mixing coefficient based on the pitches of these upper and lower amplitude envelopes; and (3) calculating a new amplitude envelope based on this mixing coefficient and the upper and lower envelopes. Lindemann, col. 20, l. 60 – col. 21, l. 2; Fig. 9.

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[6] Although Lindemann refers to numeral 210 as an "amplitude memory" in the text of the patent (Lindemann, col. 19, ll. 65-66), we nonetheless refer to this numeral as an "amplitude envelope memory" in accordance with the corresponding label for this memory in Figure 3.

ANALYSIS

We begin by construing a key disputed limitation of claim 1 which calls for, in pertinent part, generating a *control* signal based on an isolated overtone signal. Despite Appellant's argument that Lindemann's audio signals 140 and 160 are not "control signals" (App. Br. 12-24; Reply Br. 3-8), we nonetheless find no error in the Examiner's position (Ans. 7) that audio output 160 constitutes a "control signal" under its broadest reasonable interpretation. Simply put, this audio output's digital information would, at least in part, "control" production of the corresponding analog audio signal upon conversion via D/A converter 162. *See* FF 1. That is, the binary values (i.e., "1s" and "0s") contained within the digital audio signal 160 represent particular aspects and parameters of the analog waveform (amplitude, duration, etc.) that are realized only upon conversion to the analog domain.

But these representations are more than mere binary numbers: they actually provide the digital blueprint for reproducing an audible manifestation of the digital audio output upon conversion. *See id.* It is for this reason that the digital signal is converted to an analog signal before it is sent to the speaker. As an essential precursor to realizing a particular audible manifestation, the corresponding digital audio output 160 is therefore a "control signal" in that regard. We therefore find the Examiner's interpretation of "control signal" reasonable despite Lindemann's use of the term "control signal" for another signal, namely the input device's output signal (*id.*). Notwithstanding Lindemann's nomenclature, we see no reason why other signals in the reference cannot be considered "control signals" given the scope and breadth of the term.

That said, however, we nonetheless find the Examiner's rejection of claim 1 problematic. First, as Appellant indicates (App. Br. 27-29; Reply Br. 11-13), the Examiner does not squarely identify which signals in Lindemann correspond to the recited incoming electronic signals with fundamental and overtone frequency components. The Examiner does, however, indicate that Lindemann's formant filter generator 130 "isolates and filters the overtones to provide an isolated overtone signal from the incoming signal." Ans. 9. Although the Examiner does not further specify this "incoming signal," we nonetheless presume that the Examiner intended for this signal to correspond to Lindemann's excitation signal 116—a tone-based signal with a "fixed harmonic structure" that is inputted to formant filter generator and filtered resulting in intermediate tone 131 (i.e., the "isolated overtone signal"). *See* FF 3-4.[7]

But even assuming, without deciding, that this signal's "fixed harmonic structure" necessarily includes both fundamental frequency and overtone components (a finding that has not been made on this record in any event), we find problematic the Examiner's position (Ans. 8) that Lindemann's amplitude envelope builder 125 (i.e., the "signal parameter measurement element") allegedly measures the amplitude of the "isolated overtone signal," namely the intermediate tone 131. Although the amplitude envelope builder generates amplitude envelopes that multiplier 209 applies to intermediate tone 131 (FF 3-5), we cannot say that the amplitude envelope builder actually measures the amplitude of the intermediate tone. As

[7] *Accord* Ans. 8 (noting that "excitation signal 116 is filtered by filter (130) [i.e., the formant filter generator]" which results in intermediate tone signal 131)).

Appellant indicates (App. Br. 25-27; Reply Br. 9-11), the output of the formant filter generator 130 (i.e., intermediate tone 131) is not provided to the amplitude envelope builder at all, but rather *the multiplier 209* which applies the generated envelope. FF 3-4. Apart from referring to generated amplitude envelopes that are later applied to the intermediate tone, the Examiner has simply not shown that this tone's amplitude is necessarily measured—a crucial requirement for inherent anticipation.[8]

Nor do we find the Examiner's reliance on the amplitude envelope generator's interpolating stored amplitude envelopes availing in this regard. Although this technique calculates new amplitude envelopes based on stored envelopes based on input pitch and intensity (FF 6-7), and these generated envelopes are later applied to the intermediate tone (FF 3-5), the Examiner has simply not shown that this technique necessarily measures the amplitude of the intermediate tone 131 (i.e., the "isolated overtone signal"). Even assuming, without deciding, that this technique could somehow involve some form of measurement with respect to the stored amplitude envelopes, we still cannot say—nor has the Examiner shown—that the intermediate tone's amplitude would necessarily be measured. That this tone is not even provided to the amplitude envelope builder (FF 3-4) as noted previously only bolsters this conclusion.

We are therefore persuaded that the Examiner erred in rejecting independent claim 1, and independent claims 42 and 83 which recite commensurate limitations. We likewise reverse the Examiner's rejection of

[8] "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (citations omitted).

dependent claims 2, 3, 12, 13, 17-19, 25-41, 43, 44, 46, 53, 54, 58-60, 66-82, 84-88, and 90-96 for similar reasons.[9]

THE OBVIOUSNESS REJECTIONS

Since the Examiner has not shown that the additional cited references cure the deficiencies noted above regarding the independent claims, we will not sustain the obviousness rejections of (1) claims 4-11, 20-24, 45, 47-52, and 61-65 over Lindemann, Pattie, and Frick. (Ans. 5-6), and (2) claims 14-16, 55-57, and 89 over Lindemann and Suzuki (Ans. 6) for similar reasons.

CONCLUSION

The Examiner erred in rejecting (1) claims 1-3, 12, 13, 17-19, 25-44, 46, 53, 54, 58-60, 66-88, and 90-96 under § 102, and (2) claims 4-11, 14-16, 20-24, 45, 47-52, 55-57, 61-65, and 89 under § 103.

ORDER

The Examiner's decision rejecting claims 1-96 is reversed.

[9] Since our decision is dispositive regarding the Examiner's anticipation rejection, we need not address Appellant's other arguments pertaining to the Examiner's failure to articulate the specific basis for rejecting 74 dependent claims (App. Br. 29-30; Reply Br. 14), some of which were indicated as allegedly anticipated by Lindemann (Ans. 3). We note, however, that the Examiner's merely summarily alleging that "all of the claims are met by the prior art" (Ans. 9) without the requisite evidentiary support and analysis for each particular recited limitation in these claims falls well short of the requirements of 37 C.F.R. § 1.104(c)(2) as Appellant indicates (App. Br. 29-30; Reply Br. 14).

REVERSED

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